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RESEARCH ARTICLE

Comparison of particle properties in Kerr metric and in rotating coordinates

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Abstract Properties of particles in Kerr metric are compared with properties of particles in rotating coordinates in Minkowski space-time. It is shown that particles with negative and zero energies existing in the ergosphere of the rotating black hole also exist in the region out of the static limit in rotating coordinates in Minkowski space-time. Some similarities like the Penrose process and differences in both cases are analyzed.

Keywords Black holes · Kerr metric · Rotating frames

1 Introduction

It occurred that immediately after discovery of the special relativity theory relativistic effects due to rotation were studied [1]. These effects are still actively discussed in literature [2]. The importance of the rotating coordinate system is evident due to the daily rotation of the Earth.

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